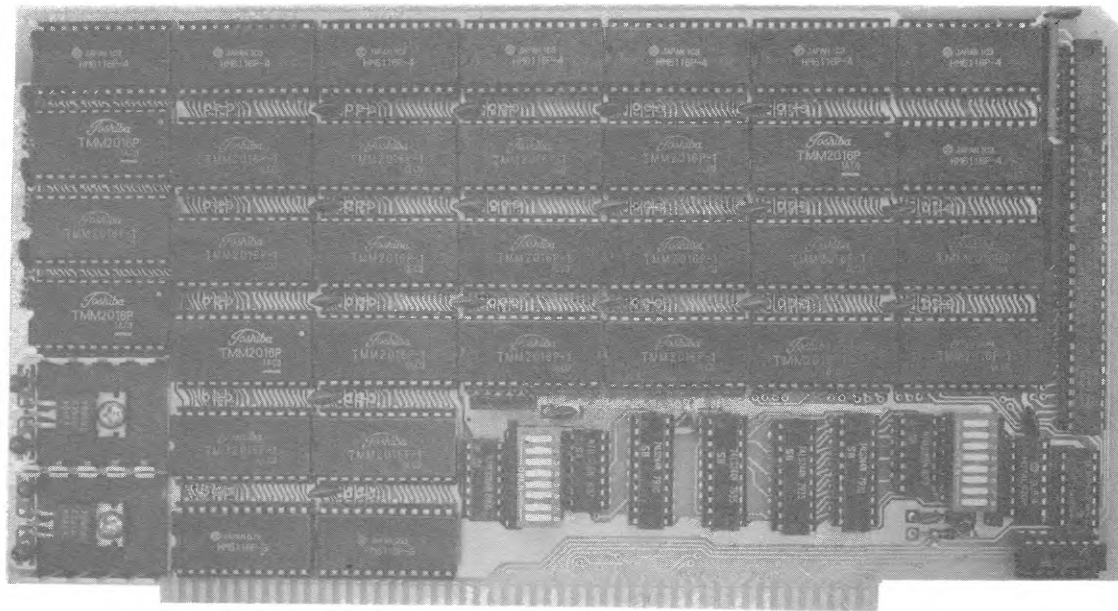


64K S100 STATIC RAM

NEW!**\$399⁰⁰**
KIT**NEW!****LOW
POWER!****RAM
OR
EPROM!**

**BLANK PC BOARD
WITH DOCUMENTATION**
\$55

SUPPORT ICs + CAPS - \$17.50
FULL SOCKET SET - \$14.50

ASSEMBLED AND TESTED ADD \$40

FEATURES:

- ★ Uses new 2K x 8 (TMM 2016 or HM 6116) RAMs.
- ★ Fully supports IEEE 696 24 BIT Extended Addressing.
- ★ 64K draws only approximately 500 MA.
- ★ 200 NS RAMs are standard. (TOSHIBA makes TMM 2016s as fast as 100 NS. FOR YOUR HIGH SPEED APPLICATIONS.)
- ★ SUPPORTS PHANTOM (BOTH LOWER 32K AND ENTIRE BOARD).
- ★ 2716 EPROMs may be installed in any of top 48K.
- ★ Any of the top 8K (E000 H AND ABOVE) may be disabled to provide windows to eliminate any possible conflicts with your system monitor, disk controller, etc.
- ★ Perfect for small systems since BOTH RAM and EPROM may co-exist on the same board.
- ★ BOARD may be partially populated as 56K.

**FULLY SUPPORTS THE NEW
IEEE 696 S100 STANDARD
(AS PROPOSED)**

**FOR 56K KIT
\$349**

16K STATIC RAMS?

The new 2K x 8, 24 PIN, static RAMs are the next generation of high density, high speed, low power, RAMs. Pioneered by such companies as HITACHI and TOSHIBA, and soon to be second sourced by most major U.S. manufacturers, these ultra low power parts, feature 2716 compatible pin out. Thus fully interchangeable ROM/RAM boards are at last a reality, and you get **BLINDING** speed and **LOW** power thrown in for virtually nothing.

Digital Research Computers
(OF TEXAS)

P.O. BOX 401565 • GARLAND, TEXAS 75040 • (214) 271-3538

TERMS: Add \$2.00 postage. We pay balance. Order under \$15 add 75¢ handling. No. C.O.D. We accept Visa and MasterCard. Tex. Res. add 5% Tax. Foreign orders (except Canada) add 20% P & H. Orders over \$50, add 85¢ for insurance.

64K S100 STATIC RAM BOARD

DIGITAL RESEARCH COMPUTERS

INTRODUCTION

THE 64K STATIC RAM YOU HAVE JUST PURCHASED IS ONE OF THE BEST RAM BARGAINS ON THE MARKET TODAY. WE HAVE GONE TO GREAT LENGTHS TO COMBINE THE RIGHT MIX OF FEATURES THAT ARE MOST OFTEN REQUIRED ON HIGH DENSITY RAM BOARDS FOR S-100 SYSTEMS.

FEATURES:

STATIC! STATIC! STATIC!

FULLY S-100 IEEE-696 COMPATIBLE!

USES THE POPULAR 24-PIN "2716" STYLE 2KXB RAM DEVICES

ON BOARD EXTENDED ADDRESSING

BOARD ACCESS TIMES UNDER 250 NS. (WITH 200 NS. RAMs)

PC BOARD IS SOLDER MASKED AND SILK SCREENED.

GOLD PLATED CONTACT FINGERS FOR LONG LIFE

ALL DATA AND ADDRESS LINES FULLY BUFFERED

FULL AND HALF PHANTOM AVAILABLE

LOW POWER DISSIPATION (<500 MA. TYP.)

TOP 8K MAY BE DISABLED IN 2K BLOCKS TO ELIMINATE CONFLICTS WITH OTHER MEMORY THAT MAY BE OCCUPIED BY SYSTEM MONITORS, DISK CONTROLLER ROMs, ETC.

RAMs AND 2716 STYLE EPROMS ARE FULLY INTERCHANGEABLE ON ONE BOARD.

NO WAIT STATES NEEDED (4 MHZ Z-80 OPERATION IS STANDARD)

64K S100 STATIC RAM BOARD

PARTS LIST:

6	14 PIN SOCKETS
4	16 PIN SOCKETS
4	20 PIN SOCKETS
32	24 PIN SOCKETS
72	JUMPER PINS
2	HEATSINKS (THM 6106-14) WITH HARDWARE
24	.01-.1 MFD 10V OR GREATER DISK BYPASS CAPS
4	1MFD 16V OR GREATER TANTALUM CAPACITORS
1	470 TO 1K OHM RESISTOR 1/4 WATT
5	2.2K TO 5.6K 10 PIN SIP RESISTOR PACKS
1	2.2K TO 5.6K 6 PIN SIP RESISTOR PACK
2	7805 VOLTAGE REGULATOR
32	TMM 2016, HM6116, OR EQV.
1	74LS00
1	74LS04
1	74LS20
4	74LS138
4	74LS244
3	74LS266
2	8 POSITION DIP SWITCH
1	RED LED

64K S100 STATIC RAM BOARD

GENERAL CONSTRUCTION HINTS

FOR SOLDERING WE RECOMMEND A 32 WATT SOLDERING PENCIL. DO NOT USE A SOLDERING GUN!!! USE SMALL DIAMETER (SUCH AS 22 GA.) ROSIN CORE 60/40 ALLOY SOLDER.

KEEP THE SOLDERING PENCIL CLEAN WITH A WET SPONGE OR CLOTH.

AFTER SUCH COMPONENTS AS RESISTORS OR CAPACITORS HAVE BEEN SOLDERED, USE A SMALL PAIR OF DIAGONAL CUTTERS TO REMOVE THE EXCESS LEAD LENGTH.

OBSERVE POLARITIES ON ALL TANTALUM CAPS AND LEDs.

IF YOU NOTICE ANY DISCREPANCIES BETWEEN THE PARTS RECEIVED AND THOSE LISTED, PLEASE NOTIFY US.

LIMITED WARRANTY

READ THE ENCLOSED YELLOW SHEET FOR A STATEMENT OF OUR LIMITED WARRANTY AS RELATES TO THIS KIT.

ALSO NOTE THAT WHEN THIS PRODUCT IS PURCHASED AS A BLANK BOARD, ALL THAT IS COVERED BY THE LIMITED WARRANTY IS THE PC BOARD ITSELF.

64K S100 STATIC RAM BOARD

ASSEMBLY INSTRUCTIONS

[] GIVE THE PC BOARD A GOOD VISUAL INSPECTION FOR ANY OBVIOUS SHORTS OR OPENS. THERE SHOULD BE NONE, BUT A FEW MINUTES SPENT HERE COULD SAVE HOURS LATER.

[] USING AN OHMMETER, INSURE THAT THERE ARE NO SHORTS BETWEEN BUSS PINS 1 AND 50.

[] INSTALL AND SOLDER THE 24 PIN SOCKETS FOR IC LOCATIONS X1 THROUGH X32. NOTE THAT THE PIN #1 ON ALL RAMs IS ORIENTED TO THE LEFT. BE CAREFUL ON X31 AND X32 NOT TO GET ANY SOLDER ON THE GOLD S100 BUSS FINGERS.

[] INSTALL AND SOLDER THE 72 JUMPER PINS NEAR X9 THROUGH X32 LABELED RAM/ROM

[] INSTALL AND SOLDER THE 4 20 PIN SOCKETS AT LOCATIONS U14, U15, U16, AND U17. ALL PIN #1 ARE TOWARD THE TOP OF THE PCB.

[] INSTALL AND SOLDER THE 4 16 PIN SOCKETS AT LOCATIONS U2, U4, U6, AND U7. PIN #1 IS TOWARD THE TOP OF THE PCB.

[] INSTALL AND SOLDER FIVE 14 PIN SOCKETS AT LOCATIONS U11, U13, U18, U20, AND U21. PIN #1 IS TOWARD THE TOP OF THE PCB.

[] INSTALL AND SOLDER THE REMAINING 14 PIN SOCKET AT LOCATION U22. NOTE THAT PIN #1 IS ORIENTED TO THE RIGHT SIDE OF THE PCB.

[] INSTALL AND SOLDER TWO 8 POSITION DIP SWITCHES AT LOCATIONS S1 AND S2. SWITCH POSITION 1 IS TOWARD THE TOP OF THE PCB.

[] INSTALL AND SOLDER 5 10 PIN SIPs AT LOCATIONS U1, U3, U5, U19, AND U12. PIN 1 OF THE SIP RESISTOR PACK IS DENOTED BY A NOTCH, DOT, OR #1. THIS PIN 1 IS UP ON THESE 5 PARTS.

[] INSTALL AND SOLDER THE 6 PIN SIP AT LOCATION U10. NOTE THAT PIN 1 ON THIS RESISTOR PACK IS TOWARD THE RIGHT SIDE OF THE PC BOARD.

[] INSTALL AND SOLDER THE BYPASS CAPS IN LOCATIONS C1-C3, C8-C28.

[] INSTALL AND SOLDER THE 470 OHM TO 1K OHM RESISTOR AT LOCATION R1.

64K 5100 STATIC RAM BOARD

[] INSTALL AND SOLDER THE LED AT LOCATION DS1. THE CATHODE (DENOTED BY THE FLAT SIDE) GOES TOWARD THE RIGHT SIDE OF THE BOARD.

[] USING THE HEATSINKS AND HARDWARE SUPPLIED INSTALL AND SOLDER THE TWO 7805 VOLTAGE REGULATORS AT LOCATIONS U8 AND U9.

[] INSTALL AND SOLDER THE FOUR RADIAL LEAD TANTALUM CAPS AT LOCATIONS C4-C7. PLEASE OBSERVE THE PROPER POLARITY WHEN INSTALLING THESE PARTS.

[] USING ANY OF THE REGULATOR MOUNTING TABS AS GROUND, MEASURE THE OUTPUT OF EACH 7805 UNDER POWER IN YOUR SYSTEM. THE OUTPUT IS MEASURED ON THE BOTTOM MOST PIN OF THE 7805. THE MEASURED VOLTAGE SHOULD BE BETWEEN 4.75 AND 5.25 VDC. ANY REGULATOR OUT OF SPEC MUST BE REPLACED.

[] INSTALL A 74LS00 IN SOCKET LOCATION U22. PIN #1 IS TO THE RIGHT.

[] INSTALL A 74LS04 IN SOCKET U21. PIN #1 IS UP.

[] INSTALL A 74LS20 IN SOCKET U20. PIN #1 IS UP.

[] INSTALL 4 74LS138s IN SOCKET LOCATIONS U2, U4, U6, AND U7. ALL PIN #1s ARE UP.

[] INSTALL 4 74LS244s IN SOCKET LOCATIONS U14, U15, U16, AND U17. PIN #1 IS UP.

[] INSTALL 3 74LS266s IN SOCKET LOCATIONS U11, U13, AND U18. PIN #1 IS UP.

[] REMEASURE THE VOLTAGE OUTPUTS ON THE 7805s NOW TO INSURE PROPER OPERATION.

SET UP AND USE

[] REMEMBER THAT THIS 64K BOARD IS PRIMARILY DESIGNED TO BE POPULATED (WITH RAM OR ROM) TO A LEVEL OF 56K TO 64K.

[] DETERMINE WHICH LOCATIONS YOU NEED TO BE RAM AND WHICH NEED TO BE 2716 EPROMS. USING 24 GA. WIRE (CLIPPED LEADS FROM MONOLITHIC CAPS ARE USUALLY PERFECT) JUMPER THE CENTER PIN AT EACH LOCATION TO EITHER RAM (RIGHT OR BOTTOM PIN) OR ROM (LEFT OR TOP JUMPER PIN). NOTE THAT X1-X8 **MUST** BE RAM ONLY. X1-X8 CORRESPOND TO THE FIRST 16K OF RAM.

[] YOU MUST HAVE PROPERLY JUMPERED ALL LOCATIONS (ABOVE X8) THAT YOU ARE USING, TO INSURE THAT NONE OF THE RAMs OR EPROMs ARE DAMAGED.

64K S100 STATIC RAM BOARD

[] INSTALL YOUR RAMs AND EPROMs AT THEIR PREDETERMINED LOCATIONS.

[] NOTE THAT THE FUNCTIONS FOR S1 AND S2 ARE SHOWN AT THE BOTTOM OF THE BOARD.

[] S1 IS THE EXTENDED ADDRESS DECODE SWITCHES. POSITION 1 CORRESPONDS TO A16 WHILE POSITION 8 CORRESPONDS TO A23.

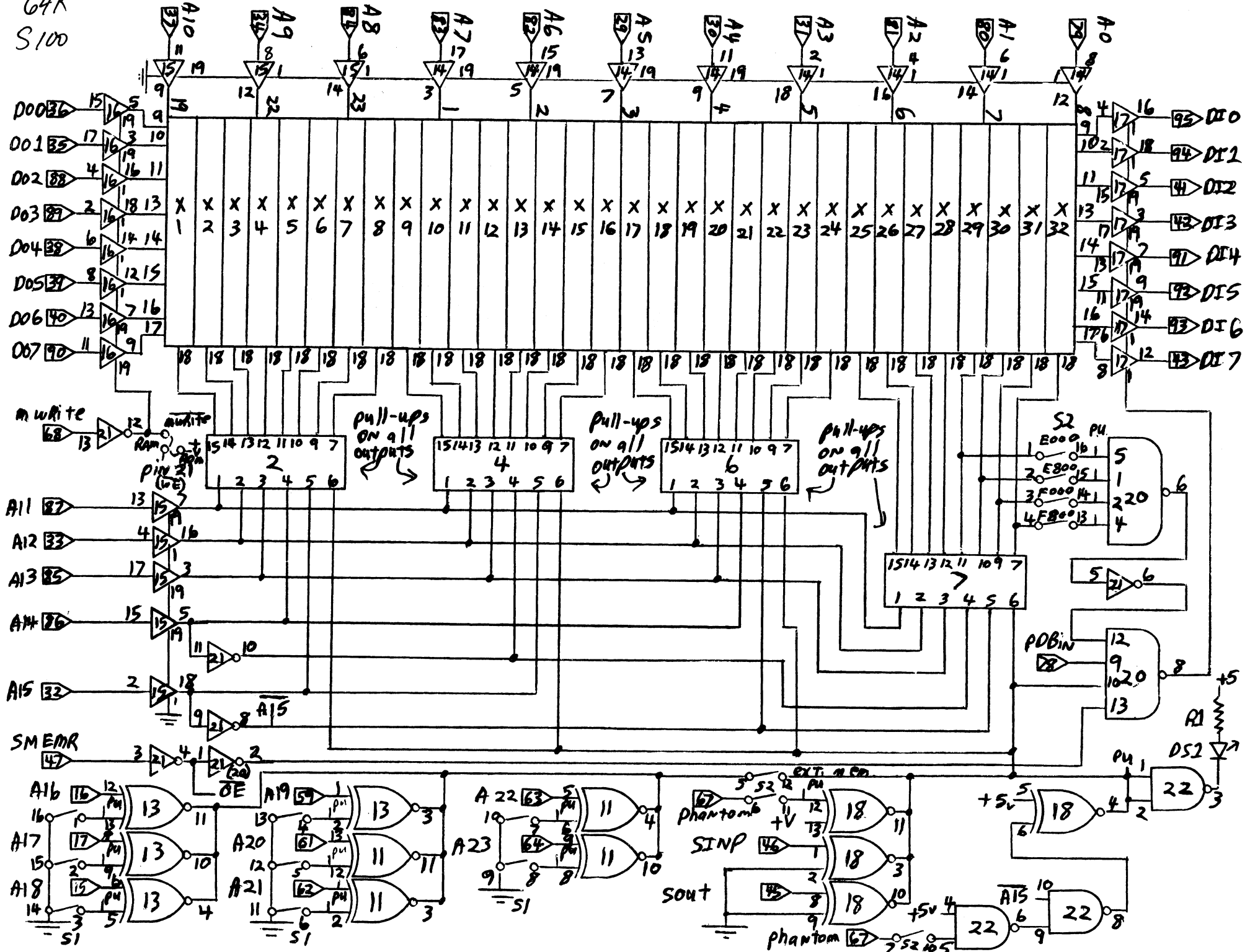
[] S2 IS THE BOARD MULTIFUNCTION SWITCH. POSITIONS 1 THROUGH 4 ARE FOR DISABLING THE 2K WINDOWS FOR SYSTEM CONFLICTS. FOR EXAMPLE: SWITCH 2 POSITION 1, WHEN CLOSED, DISABLES THE 2K BLOCK STARTING AT E000H WHICH IS X29. POSITION 5 WHEN ON ENABLES THE EXTENDED ADDRESSING. POSITION 6 WHEN ON ALLOWS PHANTOM* (BUSS PIN 67) TO DISABLE THE ENTIRE BOARD. POSITION 7 WHEN ON ALLOWS ONLY THE LOWER 32 K TO BE DISABLED WHEN PHANTOM* IS ACTIVE. MOST OF THE TIME ONLY THE LOWER 32K NEEDS TO BE PHANTOMED.

[] UNLESS YOUR SYSTEM REQUIRES AND SUPPORTS 24 BIT EXTENDED ADDRESSING, MAKE SURE THAT S2 POSITION 5 IS OFF (OPEN).

PARTIALLY POPULATING THE RAM BOARD

THIS 64K RAM BOARD WAS PRIMARILY DESIGNED TO BE POPULATED WITH A MINIMUM OF 56K. IT IS POSSIBLE TO PUT LESS THAN 56K ON THIS BOARD AS LONG AS YOU ARE CAREFUL TO MEET THE FOLLOWING CONDITION. THE UNUSED RAM SPACE BETWEEN THE TOP OF RAM ON THIS BOARD AND 56K MUST NOT BE USED ON ANY OTHER BOARD IN THE SYSTEM. FOR EXAMPLE: IF THIS BOARD IS POPULATED WITH 32K OF RAM, THEN ALL OF THE SPACE FROM 8000H TO DFFF CANNOT BE USED ON ANY OTHER BOARD IN THE SYSTEM, OTHERWISE A CONFLICT WILL OCCUR ON THE BUSS.

64K
S100



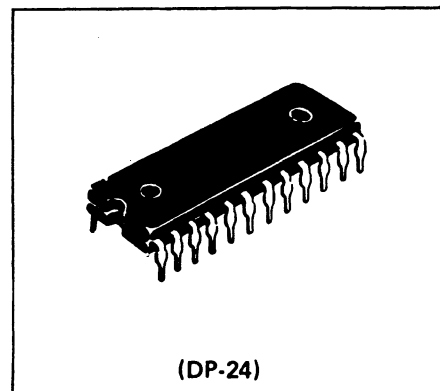
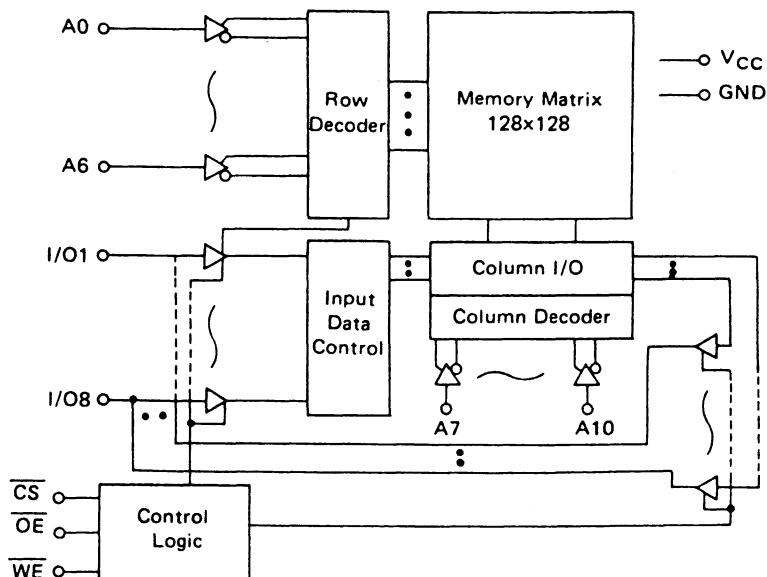
HM6116P-2, HM6116P-3, HM6116P-4

2048-word X 8-bit High Speed Static CMOS RAM

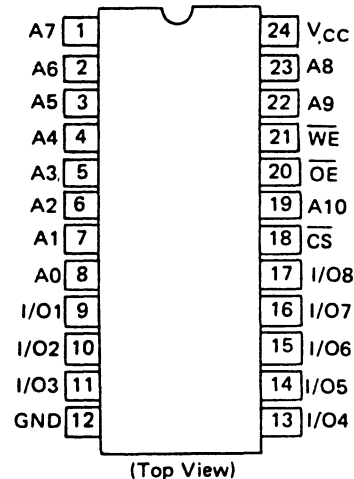
■ FEATURES

- Single 5V Supply and High Density 24 pin Package
- High Speed: Fast Access Time 120ns/150ns/200ns (max.)
- Low Power Standby and Low Power Operation; Standby: 100 μ W (typ.)
Operation: 180mW (typ.)
- Completely Static RAM: No clock or Timing Strobe Required
- Directly TTL Compatible: All Input and Output
- Pin Out Compatible with Standard 16K EPROM/MASK ROM
- Equal Access and Cycle Time

■ FUNCTIONAL BLOCK DIAGRAM



■ PIN ARRANGEMENT



■ ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Rating	Unit
Voltage on Any Pin Relative to GND	V_{IN}	-0.5 to +7.0	V
Operating Temperature	T_{opr}	0 to +70	°C
Storage Temperature	T_{stg}	-55 to +125	°C
Temperature Under Bias	T_{bias}	-10 to +85	°C
Power Dissipation	P_T	1.0	W

■ TRUTH TABLE

\overline{CS}	\overline{OE}	\overline{WE}	Mode	V_{CC} Current	I/O Pin	Ref. Cycle
H	X	X	Not Selected	I_{SB}, I_{SB1}	High Z	
L	L	H	Read	I_{CC}	Dout	Read Cycle (1)~(3)
L	H	L	Write	I_{CC}	Din	Write Cycle (1)
L	L	L	Write	I_{CC}	Din	Write Cycle (2)